

Claims

What is claimed is:

1. A system for feeding forward reticle fabrication data, comprising:
 - one or more fabricating components adapted to perform one or more reticle fabrication processes;
 - a control system operatively connected to at least one of the one or more fabricating components, the control system adapted to control, at least in part, the operation of at least one of the one ore more fabricating components;
 - one or more measurement components operatively connected to the control system, the one or more measurement components adapted to measure, *via* scatterometry, one or more reticle fabrication parameters from one or more reticle fabrication processes; and
 - a signature data store operatively connected to the control system, the signature data store adapted to store one or more scatterometry signatures.
2. The system of claim 1 where the control system is further adapted to analyze one or more reticle fabrication parameters from a reticle fabrication process and to selectively feed forward control data to one or more of the fabricating components.
3. The system of claim 2 where at least one fabricating component is further adapted to initialize a reticle fabrication process performed by the fabricating component based, at least in part, on the control data forwarded by the control system.
4. The system of claim 3 where the one or more fabricating components comprise at least one of a photoresist coater, a photoresist developer, an etcher, a resist stripper, a mask exposure tool beam including any one of an e-beam pattern, laser pattern generator or a mask repeater, a post exposure bake plate, a polisher and a quality control processor.

5. The system of claim 4 where the control system comprises:
a microprocessor programmed to analyze the one or more fabrication parameters; and
a memory, operatively connected to the microprocessor, the memory adapted to store one or more program instructions associated with analyzing the one or more fabrication parameters.
6. The system of claim 5 where the one or more measurement components comprise a scatterometry system adapted to generate one or more scatterometry signatures.
7. The system of claim 6 where the fabrication parameters comprise at least one of the planarity of a photoresist layer, the depth of a photoresist layer, the chemical composition of a photoresist layer, the width of one or more photoresist features, the slope angles of one or more features in the photoresist layer, the planarity of a substantially opaque reticle layer, the chemical composition of a substantially opaque reticle layer, the depth of a substantially opaque reticle layer, the location of one or more features in the substantially opaque reticle layer, the depth of one or more features in the substantially opaque reticle layer, the width of one or more features in the substantially opaque reticle layer, the slope angles of the walls of one or more features in the substantially opaque reticle layer, the planarity of a substantially transparent reticle layer, the chemical composition of a substantially transparent reticle layer, the depth of a substantially transparent reticle layer, the location of one or more features in the substantially transparent reticle layer, the depth of one or more features in the substantially transparent reticle layer, the width of one or more features in the substantially transparent reticle layer, the slope angles of the walls of one or more features in the substantially transparent reticle layer and the location of one or more defects in the substantially transparent reticle layer.

8. A system for feeding forward reticle fabrication data, comprising:
one or more fabricating components adapted to perform one or more reticle fabrication processes;
a fabricating component driving system operably connected to the one or more fabricating components, the fabricating component driving system operable to drive the one or more fabricating components;
a system for directing light on to a reticle;
a measuring system for measuring light reflected and/or refracted from the reticle *via* scatterometry; and
a processor operatively coupled to the measuring system and the fabricating component driving system, the processor adapted to generate a feed forward control data adapted to selectively control the one or more fabricating components *via* the fabrication component driving system.
9. The system of claim 8 where the processor is adapted to generate the feed forward control data based, at least in part, on reticle fabrication data received from the measuring system.
10. The system of claim 9 where the fabricating components comprise at least one of a photoresist applicator, a photoresist developer, an etcher, a resist stripper, a spin track, a stepper, a post exposure baker, a polisher and a quality control processor.
11. The system of claim 10 where the reticle fabrication data comprises information associated with at least one of the planarity of a photoresist layer, the depth of a photoresist layer, the chemical composition of a photoresist layer, the width of one or more photoresist features, the slope angles of one or more features in the photoresist layer, the planarity of a substantially opaque reticle layer, the chemical composition of a substantially opaque reticle layer, the depth of a substantially opaque reticle layer, the location of one or more features in the substantially opaque reticle layer, the depth of one or more features in the substantially opaque reticle layer, the

width of one or more features in the substantially opaque reticle layer, the slope angles of the walls of one or more features in the substantially opaque reticle layer, the planarity of a substantially transparent reticle layer, the chemical composition of a substantially transparent reticle layer, the depth of a substantially transparent reticle layer, the location of one or more features in the substantially transparent reticle layer, the depth of one or more features in the substantially transparent reticle layer, the width of one or more features in the substantially transparent reticle layer, the slope angles of the walls of one or more features in the substantially transparent reticle layer and the location of one or more defects in the substantially transparent reticle layer.

12. The system of claim 11 where at least one fabrication component is further adapted to alter one or more reticle fabrication settings based, at least in part, on the feed forward control data.

13. The system of claim 12 where, during one or more reticle fabrication processes, the processor maps the reticle into a plurality of grid blocks and makes a determination of fabrication parameters at the one or more grid blocks.

14. A method for feeding forward reticle fabrication control information, the method comprising:

for one or more reticle fabrication processes:

performing the reticle fabrication process;

gathering reticle fabrication data concerning the reticle fabrication performed during the reticle fabrication process, where the reticle fabrication data is gathered *via* scatterometry;

determining whether there is a subsequent reticle fabrication process and/or apparatus that can benefit from receiving feed forward control information based on the reticle fabrication data; and

if there is a subsequent reticle fabrication process and/or apparatus that can benefit from receiving feed forward control information based on the reticle fabrication data, selectively generating feed forward control information based, at least in part, on the reticle fabrication data, and selectively

forwarding the feed forward control information to the one or more subsequent reticle fabrication processes and/or apparatus.

15. The method of claim 14 where the reticle fabrication process is at least one of a photoresist application process, a photoresist developing process, an etching process, a resist stripping process, a spin track process, a stepper process, a post exposure baking process, a polishing process and a quality control process.

16. The method of claim 15 where the reticle fabrication data concerns at least one of the planarity of a photoresist layer, the depth of a photoresist layer, the chemical composition of a photoresist layer, the width of one or more photoresist features, the slope angles of one or more features in the photoresist layer, the planarity of a substantially opaque reticle layer, the chemical composition of a substantially opaque reticle layer, the depth of a substantially opaque reticle layer, the location of one or more features in the substantially opaque reticle layer, the depth of one or more features in the substantially opaque reticle layer, the width of one or more features in the substantially opaque reticle layer, the slope angles of the walls of one or more features in the substantially opaque reticle layer, the planarity of a substantially transparent reticle layer, the chemical composition of a substantially transparent reticle layer, the depth of a substantially transparent reticle layer, the location of one or more features in the substantially transparent reticle layer, the depth of one or more features in the substantially transparent reticle layer, the width of one or more features in the substantially transparent reticle layer, the slope angles of the walls of one or more features in the substantially transparent reticle layer and the location of one or more defects in the substantially transparent reticle layer.

17. The method of claim 16 where the reticle fabrication data gathered *via* scatterometry comprises one or more scatterometry signatures that can be compared to one or more stored scatterometry signatures to facilitate generating the feed forward control information.

18. The method of claim 17 where the one or more scatterometry signatures are compared to the one or more stored scatterometry signatures by pattern matching.

19. A system for feeding forward reticle fabrication control data, the system comprising:

means for fabricating a reticle;

means for sensing one or more reticle fabrication parameters *via* scatterometry;

and

means for selectively generating and feeding forward reticle fabrication control data operable to facilitate adapting the means for fabricating a reticle.